Ann. Natal Mus. Vol. 25(2) Pages 383–402 Pietermaritzburg October, 1983

Subsaharan Ceratopogonidae (Diptera) XI.[1] The Genus Serromyia Meigen

by

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SYNOPSIS

A key and illustrations are presented for the identification of the nine Subsaharan species of the predaceous midge genus *Serromyia* Meigen, including the following which are described as new: *agathae* (Transvaal), *meiswinkeli*, *neethlingi*, and *stuckenbergi* (Natal), and *rossi* (Madagascar). Diagnoses and new records are presented for previously described species, while the hitherto unknown female of *S. zuluensis* is described. *Ceratopogon armipes* de Meillon is a new junior synonym of *Serromyia noctilucor* Kieffer. Reasons are given for excluding *Serromyia fuligipennis* Clastrier from the genus *Serromyia*, but its position is left uncertain pending discovery of the male sex.

INTRODUCTION

The genus *Serromyia* Meigen, based on the type-species *Ceratopogon femoratus* Meigen and typified by a group of 15–20 European and North American species, is fairly compact, all species sharing, with minor variations, the same shining black colour, general habitus, and general form of male and female genitalia. It is likely that a close study of types and a review of structural characters will result in extensive synonymy and reduce the number of Palaearctic species considerably.

In the Southern Hemisphere of the Old World, however, the species of *Serromyia* are much more diverse, and a greater number of species show modifications of various structural characters that are only occasionally found in northern species. Some of the African species are so different from *S. femoratus*, the type-species, that we at one time considered the possibility of erecting new genera for them, rather than broadening the limits of *Serromyia*. Since they all seem basically to show the same pattern of evolutionary trends, we believe the simplest course is to leave them in *Serromyia*. In this paper we review the Subsaharan species, of which six have previously been described, and we present descriptions of five additional new species. Some new synonymy and generic shifts have also been introduced.

The biology of the Subsaharan species of *Serromyia* is unknown. According to Downes (1978), adult females of the Holarctic *Serromyia* prey upon chironomid and ceratopogonid midges and other small Diptera; according to Wirth & Grogan (1981), the larvae live in marshlands and in damp moss and are assumed to be predaceous.

Explanation of the taxonomic characters used can be found in the general papers on Ceratopogonidae by Wirth (1952) and Wirth *et al.* (1977). Most of the

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illustrations were made by Molly Ryan; a few were done by the senior author.

We acknowledge with thanks the assistance of the following persons and institutions for the loan of types and other material: Dr Richard Lane—British Museum (Natural History), London (BMNH); Dr Paul H. Arnaud, Jr.—California Academy of Sciences, San Francisco (CAS); Dr J. Clastrier—Museum National d'Histoire Naturelle, Paris (PARIS); Mr Rudy Meiswinkel, Pretoria, Transvaal (MEIS); Dr Brian Stuckenberg—Natal Museum, Pietermaritzburg (NM); Dr J. Ledger and Mrs J. Segerman—South African Institute for Medical Research, Johannesburg (SAIMR); Dr H. E. Rae—South African Museum, Cape Town (SAM). The holotypes of our new species are deposited in the National Museum of Natural History in Washington, U.S.A. (USNM), or in the above collections as indicated by the acronyms or abbreviations listed.

Genus *Serromyia* Meigen

Serromyia Meigen, 1818: 83. Type-species, *Ceratopogon femoratus* Meigen, by monotypy. Generic name cited in specific synonymy (Megerle, MS name).
Reference: Debenham, 1970 (diagnosis, figures, Australian species).

Diagnosis: Body moderately stout, nearly bare. Colour usually shining black, less often yellowish to brownish or with banded legs, punctate thorax, and patterned abdomen. Eyes bare; contiguous to moderately separated. ♀ antennal segments 3–10 short, 11–15 cylindrical and elongate; ♂ with well-developed plume; distal 3 segments elongated. Palpus slender, 5-segmented; segment 3 with indefinite sensory area, no pit. ♀ mandible with about 10 coarse teeth. Mesonotum with seriate small bristles, without anterior spine or tubercle; humeral pits absent. Fore and mid legs usually slender and unarmed; tarsomere 4 subcylindrical to more or less cordiform; claws simple and equal. Hind femur greatly swollen in both sexes, armed ventrally with numerous stout spines, usually in 2 series; tibia slender and more or less curved basally and unarmed; tarsomere 4 cylindrical; ♀ usually with a single long claw with a sharp basal barb of varying length and thickness, rarely with a pair of small, equal claws as in ♂. Wing without colour pattern (except in 1 Oriental species); microtrichia present, usually well developed; a few macrotrichia present in some species; costa extending to 0,6–0,7 of wing length; 2 more or less equal radial cells present; intercalary fork absent; media subsessile to short petiolate. ♀ abdomen stout, not modified apically; 1 or 2 functional spermathecae present. ♂ genitalia in living specimens usually more or less rotated and concealed beneath tip of pregenital terga; sternum IX short, tergum short and tapering slightly to submedian apicolateral lobes. Basistyle short and stout, dististyle long and slender. Aedeagus short with broad basal arch, distal median process variously modified according to species. Parameres usually a pair of simple elbowed or gently bent sclerites borne on short, broad, basal apodemes.

The following species is excluded from the genus *Serromyia*, but its generic position is uncertain. It probably belongs to an undescribed genus, but discovery of the male sex is needed for more accurate assessment.

Serromyia fuligipennis Clastrier, 1960: 291 (♀; Congo Rep.; fig. wing).

Type. Holotype ♀, Buku, N'Situ, Rep. Congo, iii.1957, Taufflieb, light trap.

Through the courtesy of Dr J. Clastrier the holotype was borrowed for study. It has been dissected and mounted on a slide. The wings and legs are well preserved, but the abdomen has shrunk, obscuring the genital sclerotisation, and the preparation of the head shows poor views of the shrunken palpi and only one antenna.

Diagnosis: A medium-sized dark brown species with banded legs and pale brown mesonotum marked with three short brownish vittae. Wing 0,98 mm long, entirely brownish, especially in costal cell, radial veins brownish; costal ratio 0,81. Halter brown. Femora with broad median and narrower apical pale bands, tibiae with narrow subapical pale rings. Fore femur armed ventrally with 3 widely spaced short, stout, ventral spines in a single series, and a sinuate apical spur; tarsomere 4 short and cylindrical on all legs, not cordiform, each with 2 sharp distolateral spines, ventral hyaline sensilla not visible, certainly not whip-like. Claws subequal (4–3) on fore legs, unequal (5–2) on mid and hind legs. Antennal ratio 1,23; segment 3 with 4 sensilla coeloconica ringed with fine microsetae. Palpal segment 3 with a small, round, shallow, sensory pit. Mandible with 8 coarse teeth. Spermatheca 1, pyriform, measuring 0,065 × 0,045 mm, with short neck 0,012 mm long.

Discussion. Based on the only moderately swollen hind femur without ventral armature, the ventrally armed fore femur, non-arcuate hind tibia, presence of a definite round sensory pit on the third palpal segment and ringed sensilla coeloconica on the third antennal segment, and unequal tarsal claws on the mid and hind legs, this species, as first mentioned by Clastrier, does not fit well in *Serromyia*. It resembles the genus *Kolenohelea* de Meillon & Wirth more closely, but in that genus the fourth tarsomeres are cordiform and bear a whip-like ventral sensilla, the third antennal segment lacks the ringed sensilla coeloconica, and the fore femur lacks the short, blunt, ventral spines in series.

Key to Subsaharan *Serromyia*

1 Male 2
– Female 8
2 Abdomen dorsally with distinct pattern of pale and dark areas 3
– Abdomen uniformly brown to dark brown and black 4
3 Hind femur uniformly brown; basistyle with a prominent setiferous lobe at inner base ..... **zuluensis** de Meillon & Wirth
– Hind femur dark brown to black with a broad subapical yellow band; basistyle without such a lobe ..... **neethlingi** sp. n.
4 Hind femur and tibia banded ..... **festiva** Kieffer
– Hind femur and tibia uniformly brown to black 5
5 Hind tibia with a row of long, black, heavy dorsal bristles 6
– Hind tibia without such bristles 7
6 Abdomen black but in spirit material dorsally near the apex with a well-defined white spot; aedeagus with a wide, deep, basal arch; ninth sternum deeply excavated along distal margin; parameres extending beyond basistyle **agathae** sp. n

– Abdomen without such a spot, or if present not noticeable; aedeagus basally nearly straight; ninth sternum with shallow caudal excavation; parameres shorter, stouter ..... **nocticolor** Kieffer

7 Hind femur much enlarged, 2–3 times as long as greatest breadth, with some spines on prominent enlarged tubercles; mesonotum dorsally with numerous short, fine setae scattered over entire surface ..... **stuckenbergi** sp. n.

– Hind femur narrower, 4–5 times as long as greatest width, club-shaped, without such tubercles; mesonotum with slightly longer setae arranged in rows... **meiswinkeli** sp. n.

8 One functional spermatheca 9

– Two functional spermathecae 10

9 Fore and mid legs banded; wing hyaline, radial veins pale; distal margin of eighth sternum with a pair of setiferous lobes; neck of spermatheca of constant diameter ..... **rossi** sp. n.

– Legs unbanded; radial veins brown; eighth sternum completely divided without any lobes; neck of spermatheca with broad base, tapering to duct ..... **aethiopiae** Clastrier & Wirth

10 Hind leg with basal spur on claw; femora and tibiae, and abdomen dorsally, uniformly dark brown 11

– Hind leg without basal spur on claw; mid femur with broad pale band; hind tibia with base narrowly pale; abdomen dorsally with light and dark pattern **zuluensis** de Meillon & Wirth

11 Basal spur of hind claw flat, thumb-like; one of the spermathecae kidney-shaped, with sclerotised neck long and narrow; eighth sternum longer than broad ..... **agathae** sp. n.

– Basal spur of hind claw slender and spine-like; both spermathecae oval with relatively shorter, broad necks; eighth sternum shorter than broad 12

12 Hind femur not much swollen, about 7–10 times as long as greatest width; head when measured from its top to tip of proboscis about 1,5 times as long as width across the eyes ..... **nocticolor** Kieffer

– Hind femur swollen, only about four times as long as greatest width; ratio of length of head to its width nearly 2,0 ..... **stuckenbergi** sp. n.

Serromyia aethiopiae Clastrier & Wirth (Figs 1–7)

Serromyia aethiopiae Clastrier & Wirth, 1961: 219 (♀; Gambia; fig. antenna, thorax, wing, hind leg).

Type. Holotype female, Gambia, Keneba, W. Kiang Dist., 13.viii.1957, D. H. Murphy, swept from ground nuts (BMNH).

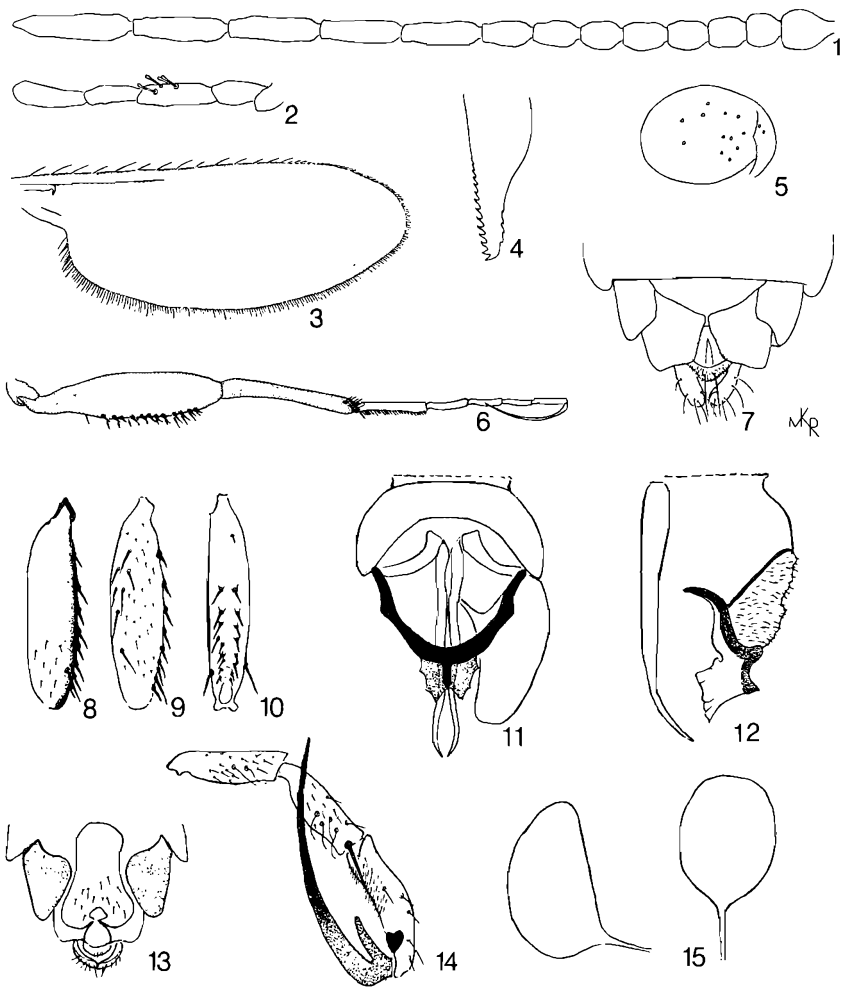
Diagnosis. Wing length 1,12 mm; breadth 0,40 mm.

Head: Eyes moderately separated. Antenna (Fig. 1) with lengths of segments in proportion of 15–11–12–13–14–14–15–15–26–27–30–19–25; antennal ratio 1,27. Palpus (Fig. 2) with lengths of segments in proportion of 8–17–25–19–25; segment 3 slender with 3–4 sensilla scattered on mesal side. Mandible (Fig. 4) with 14 coarse teeth, the proximal ones decreasing in size.

Thorax: Blackish, mesonotum dull greyish on anterior half with median vitta and lateral spots brownish. Legs black, tarsomeres 1–4 whitish, 5 slightly brownish;

fore and mid femora slender and unarmed; on hind leg (Fig. 6) femur swollen and bearing about 20 strong black spines on elevated tubercles in 2 series. Claws short and equal on fore and mid legs; on hind leg 1 long claw which if bent back would extend to midlength of tarsomere 3. Wing (Fig. 3) slightly smoky-brown due to coarse microtrichia, veins infuscated, especially the strong veins in radial field dark brown; costal ratio 0,65.

Abdomen: Blackish. Genital sclerotisation as in Fig. 7, sternum VIII completely divided on midline. 1 large brownish spermatheca (Fig. 5), oval with long tapering



Figs 1–7. *Serromyia aethiopiae* (Inyanga North, Zimbabwe): 1, antenna; 2, palpus; 3, wing; 4, mandible; 5, spermathecae; 6, hind leg; 7, genital segments. 8–15. *S. agathae* (New Agatha, north Transvaal): 8, mesal, 9, lateral, and 10, ventral views of ♂ hind femur; 11, ♂ sternum IX, basistyle, aedeagus, and parameres, ventral view; 12, ♂ paramere (left) and aedeagus (right), lateral view; 13, ♀ genital segments; 14, tarsomeres 3–5 and claw of ♀ hind leg; 15, ♀ spermathecae.

neck forming a retort-shape; measuring 0,145 by 0,100 mm with neck 0,058 mm long.

♂. Unknown.

Distribution. Gambia, South Africa, Zimbabwe.

New Records. SOUTH AFRICA: *Transvaal*: 1 ♀, Pretoria, 24.iv.1980, R. Meiswinkel (MEIS). UV light trap. ZIMBABWE: 1 ♀, Inyanga North, 13.ii.1970, C. Green (USNM).

Comment. *S. aethiopiae* differs from all other Subsaharan species except *S. rossi* in having only one spermatheca; from *rossi* it differs in its much longer hind claw and its unbanded legs. In *S. rossi*, moreover, sternum IX is incompletely divided, with two rounded setiferous lobes on the distal margin, whereas in *aethiopiae* it is completely divided mesad.

Serromyia agathae sp. n. (Figs 8–15)

A dark brown to black species with tarsomeres 2–5 slightly paler on all legs. Described from the holotype and 6 paratypes (data for minima and maxima for paratypes given in brackets when appropriate).

♂ holotype: Wing length 1,47 (1,45–1,54) mm.

Head: Black. Eyes bare and separated by width of 4 facets. Antenna dark brown to black, all segments distinctly separated from one another; segment 3 top-shaped, 4 as long as wide, 5–12 gradually narrowing, 12 being nearly twice as long as wide, 13–15 elongated, the latter with distinct terminal bristle; lengths of 11–15 in proportion of 15–15–43–43–54; antennal ratio (12–15/3–11) 0,80. Palpus with lengths of segments 3–5 in proportion of 22–10–25, segment 3 not swollen, with a shallow sensory area near inner apex bearing several capitate sensilla.

Thorax: Mesonotum, pleuron, scutellum and postnotum black; mesonotum and scutellum with some long, strong, black bristles and fine small setae; pleuron bare. Legs with femora, tibiae and basitarsi very dark brown to black, rest of tarsi slightly paler; claws small, equal, and only slightly curved. Fore leg with femur slightly enlarged, with 4–5 black setae near apex, these variable among paratypes; tibia with apical spur longer than width of tibia, spine-like and nearly straight; basitarsus with strong black ventral spine at base and 1 at apex. Mid leg with femur of normal size, about 4 strong black setae near apex (the number and location of these setae variable; in 1 paratype there are 10 scattered along length of segment); tibia armed much as femur with about 5 black setae near apex (again, the number and location variable among paratypes); basitarsus with 1 short ventral spine at base and 2 at apex. Hind leg with femur enlarged (Figs 8–10), 4–5 times as long as greatest width, ventral margin with a double row of short to medium black spines (Fig. 10), outer surface near dorsal margin with a row of 6–8 black bristles (Fig. 9); tibia with a complete row of long black bristles on extensor margin, subapical comb of fine teeth, and apical row of 6–7 strong, black spines, apical spur short, broad and brush-like; basitarsus with a complete anterior row of palisade setae, and a short ventral spine at apex; tarsomeres 2–5 unarmed. Wing unornamented; first radial cell slightly shorter than second; costal ratio 0,64

(0,62–0,65); base of vein M2 narrowly interrupted; alula bare; no macrotrichia, microtrichia minute.

Abdomen: Dark brown to black. Genitalia (Figs 11–12) black and strongly sclerotised; completely inverted, in 1 paratype inversion had only proceeded half-way when fixed in alcohol. Sternum IX with deep caudomedian excavation, the membrane connecting it with the high, deep arch of the aedeagus creates a clearly distinguishable, dead white spot on the otherwise very dark dorsum of abdomen. This easily seen characteristic was obvious in all males fixed in alcohol. Tergum IX slightly narrowed to apex which reaches just beyond the basistyles. Basistyle slightly longer than basal width; dististyle nearly straight. Aedeagus with strongly arched and darkly pigmented base bearing distally a median process best seen in side view (Fig. 12). Parameres separate, long, slender, and nearly straight, bent ventrally and pointed distally as figured.

♀. Described from allotype and 4 paratypes. In general appearance as in ♂ but on the whole smaller and with differences in leg armature and other structures as follows. Wing length 1,32 (in the 4 females from Runge Farm the mean length was 1,38 (1,32–1,43) mm. Costal ratio 0,70; second radial cell a trifle longer than in the ♂. Antenna with lengths of segments 10–15 in proportion of 15–24–28–32–30–32; antennal ratio (11–15/3–10) 0,9; last segment with a terminal bristle. Mandible with 9 teeth. Hind femur with no strong bristles on outer surface, tibia without long black bristles on extensor margin; femora and tibiae of fore and mid legs without the strong black setae seen in ♂, but 2 short spines at apex of fore and mid tibiae as in ♂; hind claw (Fig. 14) single, about as long as segments 4 and 5 combined, with a blunt, thumb-like spur basally; claws on mid and fore legs small and equal, but each with a small prominence basally. Abdomen with tergum VIII (Fig. 13) heavily sclerotised laterally, sternum an elongated, lightly pigmented plate, no long or strong setae or spines present ventrally. Spermathecae (Fig. 15) 2, subequal in size; 1 oval in shape, measuring 0,065 × 0,047 mm with a long sclerotised neck, the other kidney-shaped with a long sclerotised subterminal neck.

Distribution. South Africa.

Types. Holotype ♂, allotype ♀, 5 ♂ paratypes, Silver Leaves, New Agatha, N. Transvaal, 1–2.xi.1981 (De Meillon & Klapwyk); 2 ♂, 4 ♀ paratypes, Runge Farm, about 0,5 mile from the type locality, 16.xi.1981 (De Meillon & Cross) (holotype and allotype in NM (Type No. 2599), paratypes in BMNS, Paris SAIMR and USNM.

Discussion. In general appearance and structure the male comes near to *S. nocticolor* Kieffer with which it shares the presence of strong black bristles on the femora and tibiae of the fore and mid legs. The species is immediately recognised by its genitalic structure, differing from that of *nocticolor* and all other known species. The female differs from those of *nocticolor* and *stuckenbergi* in having a flat, thumb-like tooth at the base of the hind claw; the kidney-like shape of one spermatheca, the long necks of both spermathecae, and the shape of sternum VIII also serve to separate *agathae* from both these species.

Serromyia festiva Kieffer

Serromyia festiva Kieffer, 1911: 346 (male; Seychelles).

Distribution. Seychelles, known only from the type. Holotype ♂, Seychelles, Silhouette; low coconut-planted country near the coast, Point Étienne, 17.ix.1908 (BMNH).

Comment. The holotype is being redescribed and figured by J. Clastrier in a paper in press on the types of the Ceratopogonidae described by Kieffer (1911) from the Seychelles. For this reason the species is not treated here, other than being placed in our key.

Serromyia meiswinkeli sp. n. (Figs 27–29)

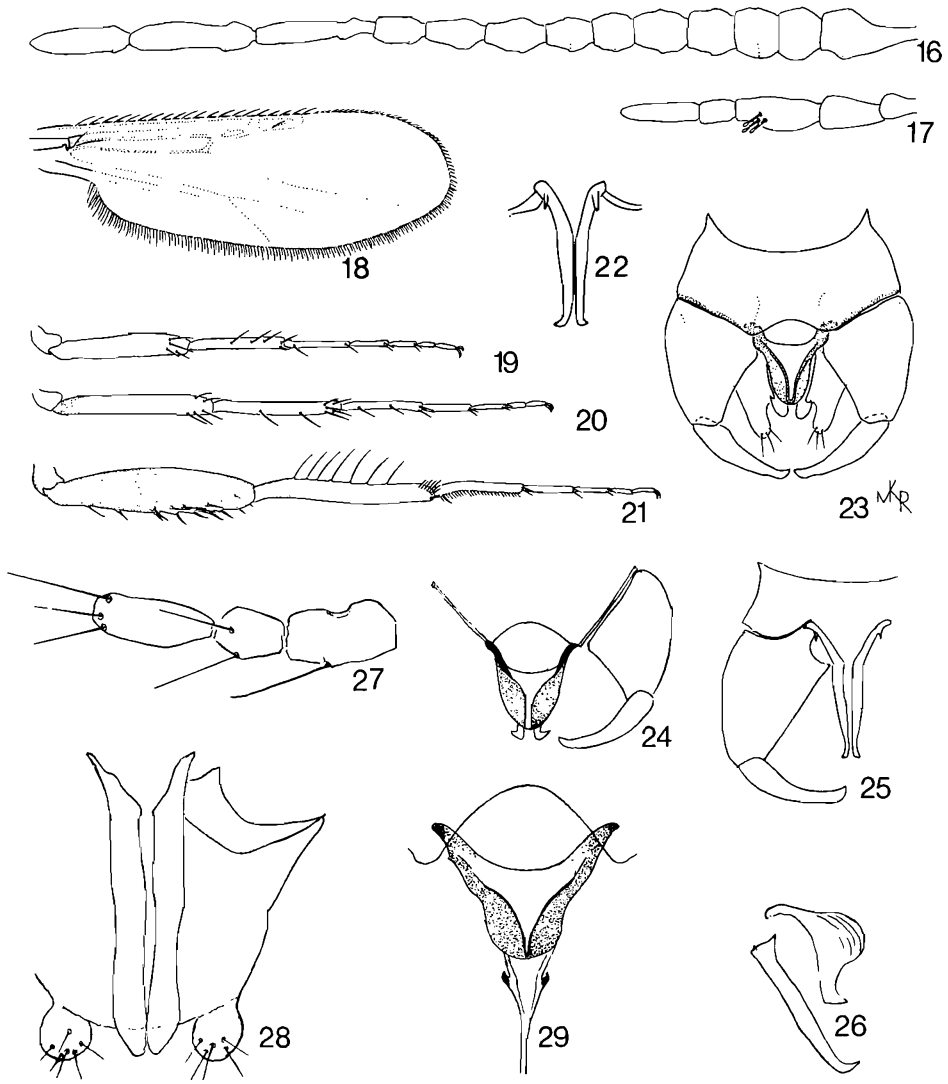
Described from the ♂ holotype.

♂ holotype. A uniformly brown to dark brown species. Wing length 1,30 mm.

Head: Broken while being prepared, width between the eyes not known. Eyes bare. Antenna with all segments separate, relative lengths of 11–15 are 15–16–26–30–30; antennal ratio (12–15/3–11) 0,64; last segment without terminal bristle. Palpus (Fig. 27) with lengths of segments 3–5 in proportion of 17–10–20; segment 3 nearly parallel-sided with a shallow sensory depression near middle.

Thorax: Mesonotum and pleuron brown, postnotum and scutellum slightly paler, latter with 6 long and a few shorter scutellar bristles. Wing unornamented; both radial cells subequal; costal ratio 0,60; vein M_2 narrowly interrupted at base; macrotrichia absent. Legs with all claws small, equal and simple. Fore leg with femur slightly enlarged, unarmed, light brown, tibia likewise slightly wider than on mid leg, apically with the usual comb of teeth, apical spur stout, straight, spine-like, a trifle longer than width of tibia; tarsus pale brown; basitarsus with a short stout ventral spine at base, tarsomeres 2–5 unarmed; tarsomere 4 slightly cordiform, bearing a whip-like apical sensilla. Mid leg with femur and tibia pale brown, unarmed; basitarsus with 3 basal and 2 apical, short brown ventral spines; tarsomeres 2–5 as on fore leg. Hind leg with femur dark brown, swollen but markedly narrowed basally, hence club-shaped, bearing the typical double row of stout black ventral spines, outer surface without long black setae; tibia strongly arcuate, slightly paler than femur, hind margin without row of long black setae, subapically with the usual comb of closely set teeth and an apical row of 6–7 rather pale, slender, short spines, apical spur short, large and brush-like; basitarsus pale brown with the usual palisade setae and no really heavy spines; tarsomeres 2–5 paler than basitarsus, unarmed.

Abdomen: Uniformly brown to dark brown. Genitalia (Figs 28–29) slightly darker than rest of abdomen; sternum IX with a moderately deep caudomedian excavation; tergum IX reaching approximately to apex of basistyles, apicolateral lobes rounded (Fig. 28); dististyle strong and slightly narrowed to beak-like tip. Aedeagus (Fig. 29) triangular in ventral profile with a low basal arch and distally a long, narrow, median process which reaches beyond distal margin of tergum. Parameres (Fig. 28) separate, each a fairly broad, bar-like sclerite reaching to about margin of tergum.



Figs 16–26. *Serromyia neethlingi* ♂ (St Lucia, Natal); 16–23 from holotype, 24–26 from a paratype: 16, antenna; 17, palpus; 18, wing; 19–21, fore, mid, and hind legs, respectively; 22, parameres; 23, genitalia; 24, aedeagus, basistyle, and dististyle; 25, parameres, basistyle, and dististyle; 26, paramere (left) and aedeagus (right), side view. 27–29. *S. meiswinkeli* ♂ holotype (Ngome, Natal): 27, palpus; 28, parameres and portion of tergum IX; 29, aedeagus and portion of tergum IX.

♀. Unknown.

Distribution. South Africa.

Type. Holotype ♂, Ngome Tea Estates, Vryheid, Natal, 26.xi.1980, R. Meiswinkel, captured hovering about three feet above a gallery forest stream in slanting afternoon sun (NM Type No. 2600).

Discussion. This species is named for Rudy Meiswinkel of Pretoria, South Africa, in appreciation of his friendship and in recognition of his contributions to our knowledge of South African biting midges.

Because of its uniformly brown colour and lack of heavy bristles on the posterior margin of the hind tibia, *S. meiswinkeli* keys out with *S. stuckenbergi*, from which it differs in many respects including the structure of the genitalia.

Serromyia neethlingi sp. n. (Figs 16–26)

Alcohol-preserved specimens of this species are beautifully marked with a black and white-banded abdomen dorsally, the thorax yellow with a dark transverse band at midlength, the pleuron banded, and the hind femur prominently banded. Described from the holotype and one paratype.

♂ holotype. Wing length 1,10 mm.

Head: Light brown. Eyes bare, separated by width of 5 facets. Antenna (Fig. 16) with all segments separated; relative lengths of segments 11–15 are 15–14–32–32–30, antennal ratio (12–15/3–11) 0,8; last segment with terminal bristle. Palpus (Fig. 17) with lengths of segments 3–5 in proportion of 19–7–18; segment 3 not distinctly swollen and without definite sensory pit.

Thorax: Mesonotum pale yellowish with dark transverse band at midlength; pleuron yellow with longitudinal dark stripe across middle and another just below paratergite; scutellum whitish with dark median spot; postnotum black. Wing (Fig. 18) unmarked; radial cells approximately equal; costal ratio 0,60; macrotrichia absent. Halter pale. Fore leg (Fig. 19) yellowish with coxa brown, femur slightly darkened at base; apex of femur with 2–3 medium sized, stiff setae; tibia pale brown with 2 strong stiff setae along shaft and 2–3 at apex, apical spur about as long as width of tibia, pale and spine-like; barsitarsus with 1 ventral spine at base and another at apex; tarsomeres 2–5 unarmed. Mid leg (Fig. 20) yellowish with distal 2/3 of coxa dark brown, trochanter and proximal fifth of femur paler brown; apex of femur with 5 or more medium-sized stiff setae; tibia with 2–3 strong stiff setae along shaft and group of 5–6 at apex; basitarsus with similar seta ventrally at base, 1 or 2 weaker ones on shaft and 2 at apex; tarsomere 2 with 2 weaker ventral setae at apex; tarsomeres 3–5 unarmed. Hind leg (Fig. 21) yellowish, distal half of coxa, all of trochanter and proximal half of femur dark brown, knee with narrow dark brown band on each side leaving femur with proximal pale band on subapical third; hind femur swollen to about 4–5 times as long as greatest breadth, with usual double row of 10–12 long, sharp, black spines on elevated tubercles on ventral margin, outer surface with single long, strong, black bristle near apex; tibia with row of strong, pale brown bristles along extensor margin, not as strong as in *S. nocticolor* or *agathae*, apically with comb of 8 teeth, apical

spur short, stout, and spine-like; basitarsus with usual palisade setae and strong brown ventral spine at base and 2 at apex; tarsomeres 2–3 each with moderately strong ventral spine at apex. Claws small, equal, and simple on all legs.

Abdomen: Basal half whitish or pale yellow with 2 black transverse bands; distal half blackish. Genitalia (Fig. 25): Sternum IX with shallow emargination on distal margin; tergum IX reaching slightly beyond basistyles and aedeagus. Basistyle somewhat triangular in outline and only slightly longer than basal width; dististyle strong and slightly curved. Aedeagus (Fig. 24) with shallow basal arch, apex broadly rounded on ventral side; posterior interior portion divided apically and hooked as in Figs 23, 24 and 26. Parameres (Figs 22, 25) separate, slender, rod-like, nearly straight, each bent slightly at tip, best seen in side view (Fig. 26); bearing short spur at proximal end near basal apodeme.

♀. Unknown.

Distribution. South Africa.

Types: Holotype ♂, St Lucia, Natal, 21.x.1980, Neethling du Toit, light trap (deposited in SAIMR). Paratype ♂, same locality, 24.xi.1971, M. E. & B. J. Irwin (NM) Type No. 2601.

Discussion. The species is named for Neethling du Toit in appreciation of his interest and co-operation in collecting South African biting midges.

The spectacular markings of alcohol-preserved specimens should make this species readily recognisable. *Serromyia festiva* Kieffer, another pale Subsaharan species with dark markings, is separable by the hind femur which has two subapical dark bands instead of one. The genitalia of *neethlingi* are distinct from those of all other Subsaharan species whose males are known.

Serromyia nocticolor Kieffer (Figs 30–44)

Serromyia nocticolor Kieffer, 1914: 268 (♂; Stellenbosch); de Meillon, 1959: 354 (as *noticolor*; ♀ descr.; Cape Prov.).
Ceratopogon armipes de Meillon, 1959: 343 (♂, ♀; Cape Prov., figs). **Syn. n.**

Types. Through the kindness of the Director of the South African Museum in Cape Town we have been privileged to examine 8 damaged syntypes of *Serromyia nocticolor* glued on one card mounted on a pin bearing the labels 'Stellenb./L.P. 1887/Serromyia nocticolor K./Kieffer det. (green label)/Type (red label)'. Two males were removed and the following label added: 'Lectotype male mtd. on slide, viii.1981, W. W. Wirth.' The lectotype ♂, mounted on a slide, has been returned to the South African Museum. Two other ♂ syntypes of *C. nocticolor* are present in the BMNH; their genitalia were dissected and mounted on slides.

Holotype ♂ of *Ceratopogon armipes*, Fransch Hoek Forest Reserve, Cape Prov., 8.v.1953. A. D. Harrison; and allotype ♀, Grahamstown, 10.xi.1953, B. R. Stuckenberg (both in SAIMR, examined through courtesy of Mrs J. Segerman).

Diagnosis. Redescribed from 4 ♂ and 1 ♀ from Pietermaritzburg, Natal.

♂. A shiny black species with whitish wings. Wing length 1,45–1,50 mm.

Head: Black. Eyes bare, widely separated (width of 4–5 facets). Antenna uniformly very dark brown to black with dense black plume; segment 3 top-shaped, 4–6 slightly wider than long, the rest gradually narrowing, 12 being slightly more than twice as long as wide; minimum and maximum lengths of 11–15 are 18–20; 25–28; 36–38; 36–40; 37–40; last segment with terminal bristle; antennal ratio (12–15/3–10) 0,82. Palpus (Fig. 32) very dark brown to black; mean lengths of segments 2–5 in proportion of 20–29–17–25; segment 3 very little swollen medianally and without a demarcated sensory pit.

Thorax: Uniformly black; mesonotum and scutellum with some long black bristles and a few smaller ones arranged in rows; pleuron without any setae or fine hairs. Wing (Fig. 34), without macrotrichia. Halter brownish at base, end of knob pale. Legs with femora and tibiae black, tarsi a shade paler. Fore leg; femur with 3–4 black bristles at apex only; tibia with 3–7 such bristles on shaft and at apex; basitarsus with short black ventral spine at base and another at apex; tarsomeres 2–5 unarmed or with 1 or 2 pale, weak slender spines. Mid leg; femur with 4–9 black bristles on shaft and at apex; tibia with 5–9 such bristles; basitarsus with 4–8 short, pale, ventral spines along its length; tarsomeres 2–5 as on fore leg. Hind leg (Fig. 43); femur a little over 4 times as long as greatest width, with 15–20 black spines in double row along ventral margin and 3–6 on outer face; tibia with 14–17 long, strong, black bristles, mostly on extensor margin but some may be placed on outer side on shaft and/or somewhat bunched at apex; in addition with usual apical transverse row of 6–7 rather long but paler spines, apical spur very small; basitarsus in addition to usual palisade setae may have a black ventral bristle at base; tarsomeres 2–4 as on fore leg. Claws small, equal, and simple on all legs.

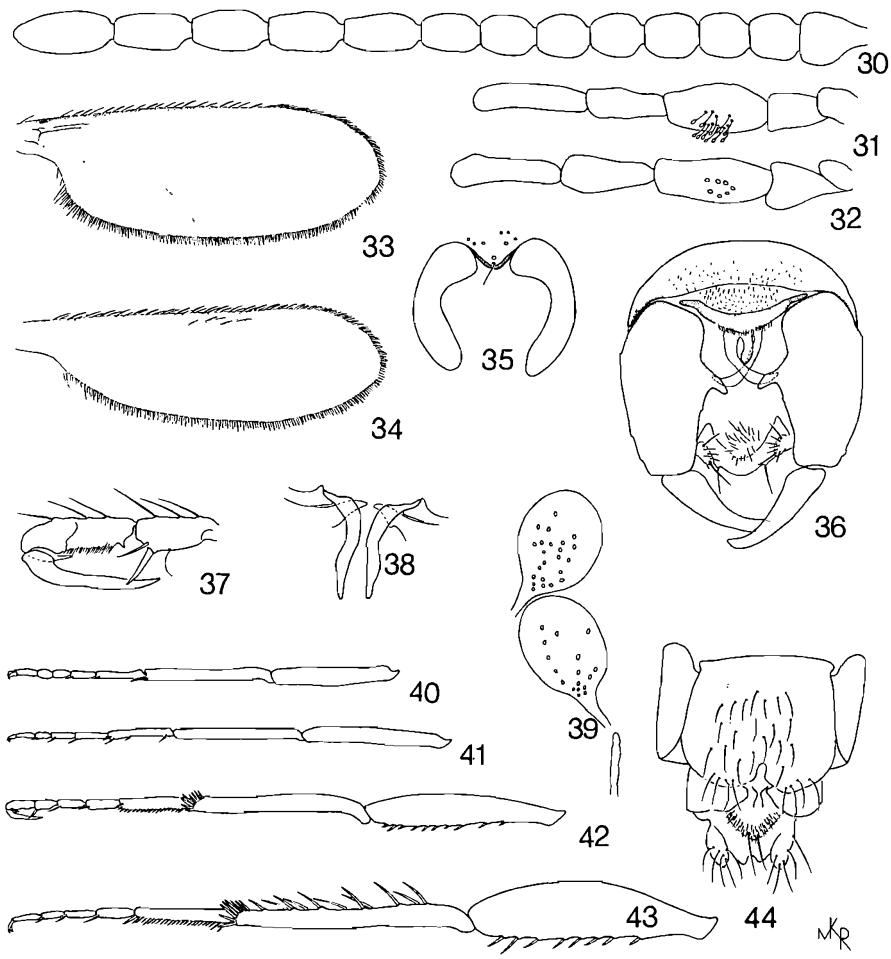
Abdomen: Black. Genitalia (Fig. 36) black, strong, and inverted; sternum IX with shallow caudal emargination; tergum IX slightly narrowed to rounded apex, about as long as basistyle, with a small setiferous lobe at each apicolateral corner. Basistyle longer than broad, with prominent submedian, inwardly directed process as figured; dististyle strong, slightly curved. Aedeagus with strong, black, straight, basal bar from which arises in midportion a 3-pronged caudal process of which the median one is sometimes seen to be split into two, the lateral processes each about twice as long as the median, the latter strongly recurved ventrally. Parameres (Fig. 38) separate, each rather short, strongly sclerotised, slightly curved blades.

♀. Resembling ♂ in general coloration. Wing length 1,32 mm.

Head: Eyes (Fig. 35) bare, separated by width of 5 facets. Mandible with 10 large teeth. Antenna (Fig. 30) with relative lengths of segments 10–15 as 15–19–18–20 –20–26, antennal ratio (11–15/3–10) 1,0; last segment with terminal bristle. Palpus (Fig. 31) with lengths of segments 2–5 in proportion of 15–25–12–28; segment 3 slightly more swollen than in ♂ and without distinct sensory pit.

Thorax: As in ♂. Wing (Fig. 33) without macrotrichia; second radial cell slightly longer than first; costal ratio 0,62. Legs shaded as in ♂. Fore leg (Fig. 40) with femur and tibia unarmed, latter with a thick, straight, spine-like apical spur about as long as width of tibia. Mid leg (Fig. 41) with femur and tibia unarmed; basi-

tarsus with 4 pale ventral spines; tarsomeres 2–4 each with an apical pair of slender, pale, ventral spines; 5 unarmed. Hind leg (Fig. 42) with femur only slightly enlarged, being about 5 or more times as long as greatest width, with a double row of 17 short black ventral spines; unlike ♂, outer surface bears no strong black bristles; tibia without long black bristles on extensor margin, apically with slanted row of 6 pale spines, apical spur small and brush-like; basitarsus with short ventral spine at base and 1 at apex, tarsomeres 2, 3, and 5 unarmed, 4 with pair of strong, sharply pointed, ventral spines apically (Fig. 37); claw single, reaching to near middle of tarsomere 4, with small spine-like basal spur. Claws on fore and mid legs small, equal, and simple.



Figs 30–44. *Serromyia nocticolor* (Pietermaritzburg, Natal); 30, 31, 33, 35, 37, 39–42, 44, ♀; 32, 34, 36, 38, 43, male: 30, antenna; 31–32, palpus; 33–34, wing; 34, eye separation; 36, genitalia; 37, fourth and fifth tarsomeres and claws of hind leg; 38, parameres; 39, spermathecae; 40, fore leg; 41, mid leg; 42–43, hind leg; 44, genital sclerotisation.

Abdomen: Very dark brown. Distal margin of sternum VIII (Fig. 44) with narrow parallel-sided incision. Spermathecae (Fig. 39) 2, pyriform; subequal, each measuring 0,070 by 0,044 mm with a sclerotised neck measuring 0,026 mm.

Distribution: South Africa.

New Records. *Cape Province:* 1 ♂, George, 27.vi–1.vii.1920, (R. E. Turner), (BMNH). 1 ♀, Pakhuis Pass, 950 m, Clanwilliam Dist., SW Cape, 17–19.x.1964 B. & P. Stuckenberg (NM). *Natal:* 1 ♀, Gillitts, Pinetown, 21.vi.1963 E. Haeselbarth (SAIMR). 4 ♂ 1 ♀, Pietermaritzburg, Town Bush, xi.1976 R. M. Miller, malaise trap (NM).

Discussion. The male, with its unbanded legs and heavy black bristles on the hind tibia, is similar to that of *S. agathae*. The genitalia of the two species are, however, quite different. The wide arch of the aedeagus and deep excavation of the ninth sternum makes even unmounted specimens of *S. agathae* recognisable. The female, on the other hand, presents a problem, and as can be seen in the key, cannot be separated from *S. stuckenbergi* with certainty. Further material may show that the apparent difference in the shape of the incision in the distal margin of the eighth sternum is diagnostic. There are additional unassociated females in our collections from widely separated localities that might be assigned to *S. noctícolor*, but they in turn show some variation and cannot be assigned with certainty at this time.

Serromyia rossi sp. n. (Figs 45–50)

♀ holotype. The unique holotype is mounted on a slide and the colouring and ornamentation observable in fresh and alcohol specimens could not be seen. It appears to have been light brown to brown in general colour with ill-defined banding on the fore and mid legs. Wing length 1,10 mm.

Head: Brown; eyes bare and separated by width of less than 2 facets. Antenna lost. Palpus (Fig. 45) with lengths of segments 3–5 in proportion of 25–12–24; segment 3 very slightly swollen, without sensory pit or demarcated sensory area. Mandible (Fig. 47) with 11 teeth.

Thorax: Mesonotum brown with some paler markings, the extent and pattern of which could not be determined; scutellum pale brown with median dark spot, 2 median bristles and a lateral on each side; postnotum brown. Wing (Fig. 46) without any distinguishing features; costal ratio 0,66. Halter deeply infuscated. Fore leg with coxa, trochanter, and femur brown, latter slightly swollen, unarmed; tibia with a narrow sub-basal pale band followed by an ill-defined and larger dark band, extreme apex infuscated, unarmed, apical spur short, stout, and spine-like; basitarsus pale brown with a ventral spine at base and another apically; tarsomeres 2–5 unarmed. Mid leg with coxa and trochanter brown, femur with basal and apical quarters brown, rest paler, unarmed; tibia marked as on fore leg; unarmed; basitarsus with a black ventral spine basally, 4 weaker ones along ventral margin, and 2 similar ones at apex; tarsomeres 3 and 4 each with a weak ventral spine apically. Hind leg (Fig. 49) with coxa, trochanter, and femur dark brown, latter swollen, being about 3–4 times as long as greatest width, with a character-

istic double row of 12–15 short, sharp, black, ventral spines, outer surface without any heavy setae or bristles; tibia uniformly dark brown or faintly paler distally, unarmed, subapically with a comb of teeth and apically a row of 6 bristles, apical spur small, stout, and brush-like; basitarsus with the usual palisade setae and a single, strong, spine-like ventral bristle basally; tarsomeres 2–5 unarmed; 5 with single, simple claw about as long as tarsomeres 4 and 5 combined, no basal spine or tooth present. Claws on fore and mid legs small, equal, and simple.

Abdomen: With broad dark transverse bands. Genital sclerotisation (Fig. 50) without any heavy bristles, setae or spines; sternum VIII with a pair of setiferous lobes on distal margin. Spermatheca (Fig. 48) single, dark brown, oval, measuring 0,110 by 0,078 mm, with a slender sclerotised neck measuring 0,013 mm long, a few small hyaline dots present.

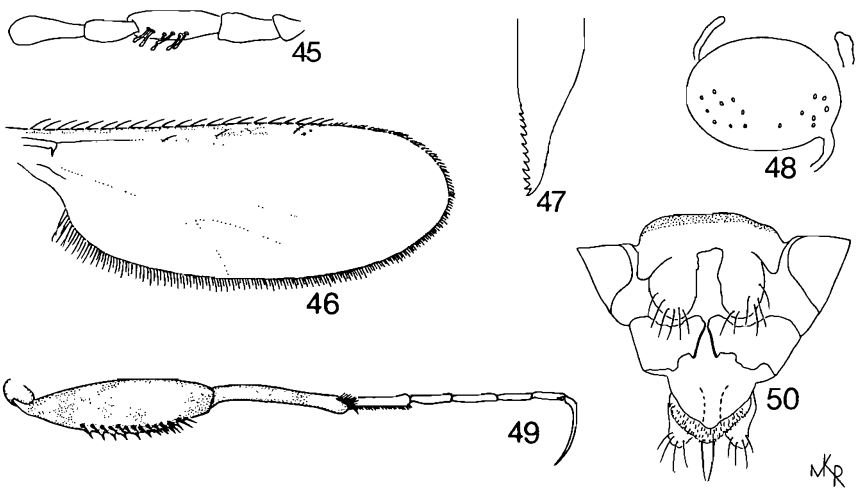
♂. Unknown.

Distribution. Madagascar.

Type. Holotype ♀, Ankarafontsika Forest Reserve, near Marovoay, 1.xii.1959, E. S. Ross (CAS).

Discussion. This species is named in honour of its collector, Dr E. S. Ross of the California Academy of Sciences in San Francisco, in recognition of his extensive collecting expeditions and his marvellous photography of the natural history of Subsaharan Africa.

This species and *S. aethiopiae* are the only Subsaharan members of the genus with a single spermatheca. The two are easily separated, *S. rossi* being generally pale with some banding of the legs, whereas *S. aethiopiae* is dark brown with unbanded legs; in addition the latter has the sternum VIII completely divided whereas in *S. rossi* the sternum is not completely divided and the distal margin bears two setiferous lobes.



Figs 45–50. *Serromyia rossi* ♀ holotype (Madagascar): 45, palpus; 46, wing; 47, mandible; 48, spermatheca; 49, hind leg; 50, genital sclerotisation.

Serromyia stuckenbergi sp. n. (Figs 51–64)

This is the largest of the known Subsaharan species; it is mostly very dark brown or black in colour except for the tarsi which are whitish, though in the female the fifth tarsomere is slightly infuscated.

♂. Described from the allotype with data (where appropriate) from 2 paratypes in brackets. Wing length 1,65 (1,67) mm.

Head: Black dorsally, mouthparts, clypeus, palpus and antennal flagellum paler. Eyes bare; separated by width of 4 facets. Antenna with lengths of segments 11–15 in proportion of 20–25–40–40–37; antennal ratio (12–15/3–11) 0,76 (0,72–0,90); last segment with terminal bristles. Palpus with lengths of segments 2–5 in proportion of 20–28–15–25; segment 3 not swollen.

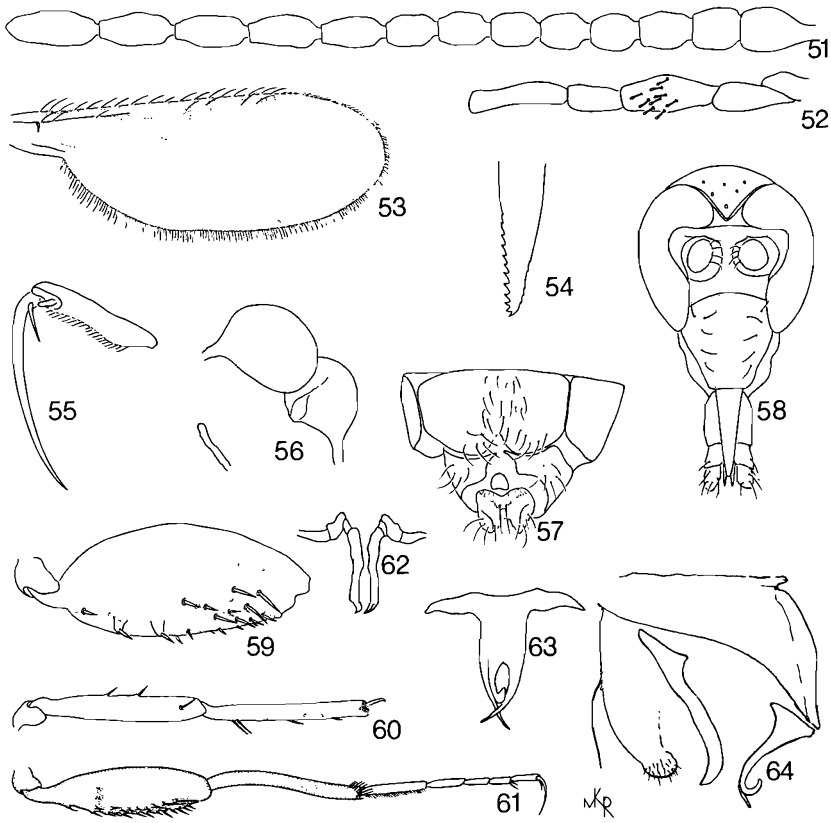
Thorax: Uniformly dark brown to black; mesonotum dorsally with numerous fine short setae scattered over entire surface. Wing hyaline, veins poorly visible. Halter with base of stem brown, knob white. Legs with coxae, trochanters, femora, and tibiae dark brown, tarsi whitish. Fore leg (Fig. 60) with femur slightly swollen with 3 (3–5) short, black spines; tibia with 4 (6–9) spines on shaft, apical spur long, straight, dark; basitarsus with 3 (0–3) weak ventral spines; tarsomeres 2–5 unarmed. Mid leg: femur with 8 (11–16) black spines; tibia with 3 (4–5) and basitarsus with 6 (6–8) ventral spines, not as strong or black as those on femur. Hind leg (Fig. 59) with femur more broadly swollen than usual 2,5 (2,4–3,3) times as long as greatest breadth, with heavy black spines as follows: inner surface 12, ventral margin 7, outer surface 12; on inner surface 2–3 of these spines mounted on unusually large tubercles; tibia unarmed, with an apical row of 8 bristles and a small, apical, spine-like spur. All claws small, equal, and simple.

Abdomen: Uniformly dark brown. Genitalia (Fig. 63–64): Sternum IX with distal margin convex; tergum IX short, apicolateral lobes not extending beyond basistyles. Basistyle somewhat triangular in outline, only slightly longer than basal width; dististyle short and strong. Aedeagus with low basal arch, produced distally into a pair of slender, pointed sclerites between which arises a third about the same length but with apex bent ventrad. Parameres (Fig. 62) separate, each in form of a stout, nearly straight, bar-like sclerite.

♀. General coloration as in ♂; hind femur of normal size and armature. Described from the holotype with data from 3 paratypes in brackets when appropriate. Wing length 1,36 (1,32) mm.

Head: Elongated (Fig. 58), nearly twice as long as width across eyes; top of head, face, mouthparts, antenna and palpus dark brown. Eyes separated by width of 4–5 facets (slightly greater than in ♂). Antenna (Fig. 51) with lengths of segments 10–15 in proportion of 15–25–22–23–23–28; antennal ratio (11–15/3–10) 0,90 (0,80). Palpus as in Fig. 52. Mandible (Fig. 54) with 14 teeth.

Thorax: Colour as in ♂; scutellum with 6 long, strong bristles and some smaller slender ones. Wing (Fig. 53) as in ♂; microtrichia coarser giving membrane a slightly milky tinge; veins slightly infuscated; costal ratio 0,70. Legs with colour as in ♂ but tarsomere 5 a shade darker than 1–4. Fore leg with femur slightly enlarged; tibia unarmed, apical spur spine-like and about as long as width of tibia;



Figs 51–64. *Serromyia stuckenbergi* (Brandkop, Cape Province); 51–58, 61, ♀; 59–60, 62–64, ♂: 51, antenna; 52, palpus; 53, wing; 54, mandible; 55, fifth tarsomere and claw of hind leg; 56, spermathecae; 57, genital sclerotisation; 58, anterior view of head; 59, hind femur; 60, fore femur and tibia; 61, hind leg; 62, parameres; 63, genitalia, parameres removed; 64, side view of tergum IX, sternum, parameres and aedeagus.

tarsomeres 2–5 unarmed. Mid leg with femur and tibia unarmed, latter with a single spine near apex in one specimen; basitarsus with 8 ventral spines along shaft; tarsomeres 2–5 unarmed. Hind leg (Fig. 61) with femur about 4 times as long as greatest width, with a double row of 12 (8–14) short, strong, black spines along ventral margin, the proximal spines not mounted on enlarged tubercles as in ♂, inner and outer faces devoid of strong spines or bristles; tibia unarmed, with apical row of 8 bristles and a small spine-like spur; basitarsus and tarsomeres 2–3 unarmed, 4 with a pair of ventral spines apically; 5 (Fig. 55) with a single claw about as long as tarsomeres 4 and 5 combined (0,8–1,0); basal spur of claw slender and sharply pointed. Claws on fore and mid legs small, equal, and simple.

Abdomen: Very dark brown to black; sternum VIII (Fig. 57) broader than long, distal margin with a V-shaped incision. Spermathecae (Fig. 56) 2, dark, oval; subequal, each measuring 0,078 by 0,065 mm with a short, wide neck.

Distribution. South Africa.

Types. *Cape Province:* Holotype ♀, allotype ♂, 1 ♂ 3 ♀ paratypes, Brandkop Area, Calvinia Dist., south-west Cape, Cape Prov., 14.ix.1964, B. & P. Stuckenberg (NM, BMNH, PARIS, USNM). *Natal:* 2 ♂ 4 ♀ paratypes, Gillits, Pinetown Dist., 21.xi.1963, E. Haeselbarth (SAIMR, USNM); 1 ♀ paratype, same data but collected by B. & P. Stuckenberg (NM). 1 ♂ paratype, Oribi Gorge Reserve, Umzimkulwana Valley, 21–28.xi.1960, B. & P. Stuckenberg (NM). Natal Museum Type No. 2602.

Discussion. The species is named for Brian R. Stuckenberg of the Natal Museum in recognition of his contributions to the study of South African Diptera, and in appreciation of his interest in collecting study material for us.

The female of *S. stuckenbergi* resembles that of *S. agathae*, differing as discussed under that species. In the male the absence of long, heavy, black bristles on the hind margin of the hind tibia, the greatly enlarged hind femur with some basal spines mounted on unusually large tubercles, and, of course, the genitalia serve to separate the species immediately.

Serromyia zuluensis de Meillon & Wirth (Figs 65–75)

Serromyia zuluensis de Meillon & Wirth, 1981: 589 (♂; Natal; fig. hind leg, abdomen, genitalia).

Type. This species was described from the ♂ holotype, Mseleni, KwaZulu, Natal, 13.x.1979, De Meillon, Jansen & Eckard, at light (in SAIMR).

♀. We take this opportunity to describe the ♀ from a Transvaal specimen. General coloration as well as leg and wing structure as in ♂. Wing length 1,0 mm.

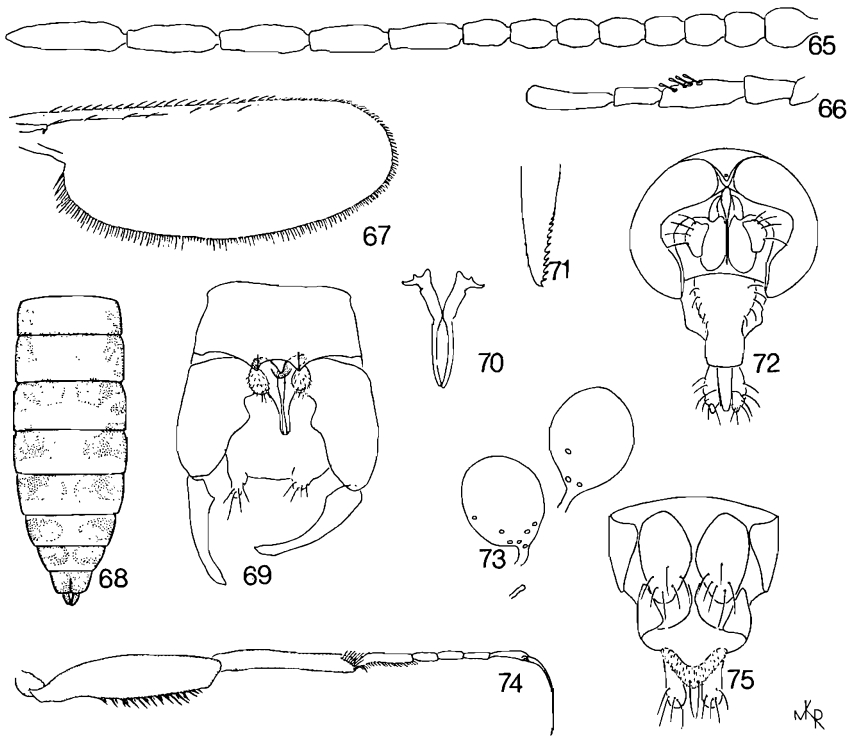
Head (Fig. 72): Eyes widely separated, bare. Antenna (Fig. 65) with lengths of flagellar segments 10–15 in proportion of 25–40–40–45–45–60; antennal ratio (11–15/3–10) 1,0; last segment with an apical seta. Palpus (Fig. 66) longer than proboscis by the length of segment 5; relative lengths of segments 2–5 are 30–40–25–45; as in ♂, 5 slightly club-shaped, 3 without sensory pit. Mandible (Fig. 71) with 11 teeth.

Thorax: Slightly darker than ♂. Wing (Fig. 67) hyaline, when mounted dry the veins are well defined and the radial cells seen to be subequal as in ♂; costal ratio 0,60. Halter pale. Legs as in ♂, including armature of hind femur (Fig. 74); on hind leg tarsomeres 2–5 approximately subequal in length; the single long claw without basal spur and when bent back would reach nearly to apex of tarsomere 2.

Abdomen: With distinctive colour pattern as in Fig. 68. Genital sclerotisation as in Fig. 75; sternum VIII completely divided in a pair of oval submedian lobes bearing long setae on posterior portion. Spermathecae (Fig. 73) 2, subglobular, pigmented; approximately subequal, each measuring 0,055 by 0,044 mm; with a short, slender, pigmented neck.

Distribution. South Africa.

New Records. *Transvaal:* 1 ♀, Soutini, Gazankulu, 18.x.1980, De Meillon & Cross, in UVL trap (NM). ZIMBABWE: 1 ♀, Kariba, 1675 ft, 26.x.1967, Birkenmeyer, light trap (USNM); 2 ♂ 1 ♀, Nkai Region, collected in truck trap be-



Figs 65–75. *Serromyia zuluensis* (Zimbabwe); 65–68, 71–75, ♀; 69–70, ♂: 65, antenna; 66, palpus; 67, wing; 68, dorsal colour pattern of abdomen; 69, genitalia, parameres removed; 70, parameres; 71, mandible; 72, anterior view of head; 73, spermathecae; 74, hind leg; 75, genital sclerotisation.

tween Sibuyu and Whalesdam, 25.iii.1981, R. J. Phelps (USNM); 2 ♀, Ruya Camp, ii.1970, Phelps (USNM).

Discussion. The male with its ornamentation resembles that of *S. neethlingi*, but is readily separated by lacking the distinct yellow subapical band on the hind femur; in the genitalia (Figs 69–70) the presence of the round setiferous lobes at the bases of the basistyles is distinctive, apparently comparable to the bilobed setiferous structure seen at the base of the aedeagus in *S. stuckenbergi*. In the female, the single long hind tarsal claw without basal spur, presence of two spermathecae, and the pair of oval setiferous sclerites of the eighth sternum are distinctive.

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Date received: 16 July 1982.